

ABSTRACT OF THE DISCLOSURE

A voltage-controlled tunable comb-ring type filter which includes a plurality of resonators and wherein the plurality of resonators include a first of at least two combline type resonators, a first of at least one ring type resonator coupled to the first of at least two combline type resonator, a second of the at least two combline type resonator coupled to the first of at least one ring type resonator and cross coupled to the first of at least two combline type resonators, and at least one of the plurality of resonators includes at least one variable capacitor. An input transmission line is connected with at least one of the plurality of resonators and an output transmission line is connected with at least one of the resonators;.

The cross coupling mechanism between the second of the at least two combline type resonators with the first of at least two combline type resonators can be through a transmission line shorted on all ends of the at least two combline type resonators or by placing the first of at least one ring type resonator in a different layer or by keeping all of the at least two combline type resonators relatively straight and placing the first of at least one ring type resonator such that cross coupling occurs between the plurality of resonators by virtue of the proximity of all of the plurality of resonators.